

*Atty. Docket No. 389522*

**IN THE CLAIMS**

Please amend the claims as follows:

1. (Previously Presented) A method for encrypting programs for encrypted execution on a computer network having a remote host computer, comprising the steps of:  
encrypting a program as a unitary matrix with  $n$  rows and  $n$  columns;  
encrypting an input data string to the program as a vector of length  $n$ , wherein execution of the program on the input data string is realized by matrix multiplication of the unitary matrix with the vector;  
loading the encrypted program and the encrypted data string on the host computer;  
executing the encrypted program, using the encrypted data string, on the host computer;  
communicating results from the host computer to the network; and  
decoding the results into output representative of executing the encrypted program with the encrypted data string, wherein computations and data associated with the program and data string are unintelligible and useless at the host computer.
2. (Previously Presented) A method of claim 1, wherein the step of encrypting a program comprises converting the program to a unitary matrix multiplication.
3. (Original) A method of claim 2, wherein the step of converting the program comprises converting the program to a unitary matrix multiplication  $U$  such that  $U \in U_n$  for some integer  $n$ , where  $U_n$  represents a group of unitary matrices of size  $n$ .
4. (Previously Presented) A method of claim 3, wherein the step of encrypting the program comprises generating two independent identically distributed unitary matrices  $X, Y$  from the uniform probability distribution over  $U_n$  determined by the Haar distribution.
5. (Previously Presented) A method of claim 4, wherein the step of encrypting a program comprises the steps of computing  $U'$  as  $XUY^*$  and communicating  $U'$  to the remote host computer over the network.
6. (Previously Presented) A method of claim 4, wherein the step of encrypting the input data string comprises converting the input data string to a vector  $b$ .

*Atty. Docket No. 389522*

7. (Previously Presented) A method of claim 6, wherein the step of encrypting comprises the steps of computing  $b'$  as  $Yb$  and communicating  $b'$  to the remote host over the network.

8. (Previously Presented) A method of claim 7, wherein the step of executing the encrypted program, using the encrypted data string, on the host computer comprises the steps of computing the product of  $XUY^*$  and  $Yb$  and communicating results to the network.

9. (Previously Presented) A method of claim 8, wherein the step of decoding the results into output comprises computing  $X^*XUb$ , external of the host computer, to determine the multiplication of  $Ub$  as desired output of the program, wherein  $XUY^*$  and  $Yb$  is  $(XUb)$  and  $X^*XUb$  is obtained by matrix multiplication  $X^*(XUb)$ .

10. (Original) A method of claim 1, wherein the step of decoding comprises decrypting at a control computer connected to the network and the host computer.

11. (Original) A method of claim 1, wherein the network comprises the Internet.

12. (Original) A method of claim 1, wherein the network comprises a virtual private network.

13. (Original) A method of claim 1, wherein the network comprises a local area network (LAN).

14. (Previously Presented) A method of claim 1, further comprising embedding one or more constants into the input data string or program, prior to encrypting, to detect incorrect execution or data tampering.

15. (Currently Amended) A secured computer network for executing encrypted computer programs at a remote host computer without sharing intelligible or otherwise useful program code, computations or data associated with execution, comprising:

a control computer for encrypting a program as a unitary matrix with  $n$  rows and  $n$  columns and for encrypting an input data string to the program as a vector of length  $n$ , wherein execution of the program on the input data string is realized by matrix multiplication of the unitary matrix with the vector; and

*Atty. Docker No. 389522*

a host computer, in network with the control computer, for loading the encrypted program and the encrypted data string, the host computer executing the encrypted program, using the encrypted data string, and communicating results to the control computer for decoding, the host computer having insufficient substantially ~~as~~-intelligible ~~or otherwise useful~~ program code, computations or data associated with ~~execution of~~ to execute the encrypted program

16. (Previously Presented) A network of claim 15, wherein the control computer embeds one or more constants into the unitary matrix or data string, wherein the results from the host computer indicate tampering or incorrect execution of the encrypted program.